

Lidar Point Cloud on AWS

The USGS [3D Elevation Program \(3DEP\)](#) is making available a growing subset of it's Lidar Point Cloud data through an Amazon Web Services (AWS) [Requester Pays](#) S3 bucket. This service provides knowledgeable users with an option for optimized download or direct access to potentially all of the USGS 3DEP Lidar Point Clouds.

The 3DEP Lidar Point Cloud stored in AWS is currently only available in the open and compressed LAZ format. The USGS is in the process of making all of its Lidar Point Cloud data available in this format and expect for the full set of data to be available by summer 2018.

Accessing the data requires an AWS account and charges are billed directly by Amazon to the user's (or requester's) account. Charges are described in the Frequently Asked Question, [How much does it cost to use the lidar Requester Pays option?](#)

For those familiar with the AWS environment the specifics to immediately access the data follow:

AWS Bucket Name: **usgs-lidar (Requester Pays)**
AWS Region: **US West (Oregon)**

The following instructions are provided to help guide those who may be unfamiliar with the AWS environment to better understand and navigate the available options.

Creating an AWS Account

To access the **usgs-lidar** bucket, the end-user **must** create an AWS account at <https://aws.amazon.com/free/> so that any charges associated with bucket access can be billed to the requesting individual.

Once an account has been created, the user will need to create one IAM User with access keys which can be used by a number of clients designed to simplify access to the data.

Creating an IAM User Access Key

An IAM user allows specific privileges to be assigned to individual users to customize access to various AWS resources. To access the **usgs-lidar** bucket only requires read-only access to S3 buckets.

1. Sign in to the AWS Console using your account credentials at <https://aws.amazon.com/console/>
2. Open the IAM console at <https://console.aws.amazon.com/iam/>.
3. In the navigation pane, choose **Users** and then choose **Add user**.
4. Type the user name for the new user. For instance: 'USGS-Lidar' and select the checkbox next to **Programmatic access** and click on the **Next:Permissions** button.

Add user



Set user details

You can add multiple users at once with the same access type and permissions. [Learn more](#)

User name*

[+ Add another user](#)

Select AWS access type

Select how these users will access AWS. Access keys and autogenerated passwords are provided in the last step. [Learn more](#)

- Access type* ☒ **Programmatic access**
Enables an **access key ID** and **secret access key** for the AWS API, CLI, SDK, and other development tools.
- ☐ **AWS Management Console access**
Enables a **password** that allows users to sign-in to the AWS Management Console.

* Required

[Cancel](#)

[Next: Permissions](#)

5. At the Set Permissions screen select the **Attach existing policies directly** option, type **S3** into the search box, and select the checkbox next to **AmazonS3ReadOnlyAccess**. This is the only permission that is necessary to access the USGS-Lidar data. Click the **Next:Review** button to continue.

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Requester Pays Instructions

Add user



Set permissions for USGS-Lidar

Add user to group

Copy permissions from existing user

Attach existing policies directly

6. After reviewing the settings, click the **Create User** button to finish.
7. The next screen should look something like the following:

Add user



Success

You successfully created the users shown below. You can view and download user security credentials. You can also email users instructions for signing in to the AWS Management Console. This is the last time these credentials will be available to download. However, you can create new credentials at any time.

Users with AWS Management Console access can sign-in at: <https://807456243234.signin.aws.amazon.com/console>

[Download .csv](#)

	User	Access key ID	Secret access key
	USGS-Lidar	AKIAIS2UKIAJ2MQ2ZE5A	***** Show

It is critical that you record in a safe and secure location the **Access key ID** and the **Secret access key** available on this screen. You can also download the 'Download.csv' file which contains this information.

NOTE: After leaving this screen you will not be able to recover this information

Accessing Data via Third-Party Clients

Data found in a requester pays S3 bucket **cannot** be browsed or downloaded directly via a simple URL. It is possible to construct RESTful requests for downloading data without a client. Documentation for doing this type of request is available from Amazon at:

<http://docs.aws.amazon.com/AmazonS3/latest/dev/ObjectsinRequesterPaysBuckets.html>

However, most users will want to take advantage of third-party clients that simplify access to the AWS S3 Requester Pays bucket. Once configured, the GUI-based clients are similar to the drag-and-drop capabilities found in file browsers like Windows Explorer, and command-line utilities can provide powerful tools for batch processing with batch files or scripts.

Disclaimer: The USGS does not endorse any of the clients referenced in this instruction guide or claim that this list is exhaustive. The following is provided as a sample of the clients available with examples of how to use and is intended to give basic guidance on the steps necessary to configure any client.

AWS Command Line Interface (CLI)

The AWS CLI is freely available on Windows, Mac and Linux platforms. It does not include a graphical user interface (GUI). Instead, commands are typed in a terminal window. AWS CLI is a powerful tool for batch processing and script-based workflows.

Documentation including installation instructions are available at <https://aws.amazon.com/cli/>.

Once installed, the AWS CLI can be configured using the **aws configure** command using the **usgs-lidar** IAM user's Access Key and Secret Access Key:

```
aws configure
AWS Access Key ID [*****TLYA]:
AWS Secret Access Key [*****o5AY]:
region name [us-west-2]:
Default Default output format [html]:
```

If the configuration is correct the following command will produce a directory listing of all the Lidar Projects.

```
aws s3 ls s3://usgs-lidar/Projects/ --request-payer requester
```

Similarly, the LAZ files within a Lidar project directory can be listed with the command:

```
aws s3 ls s3://usgs-lidar/Projects/PR_PuertoRico_2016_LAS_2017/
--request-payer requester
```

To retrieve a file the command would look something like this:

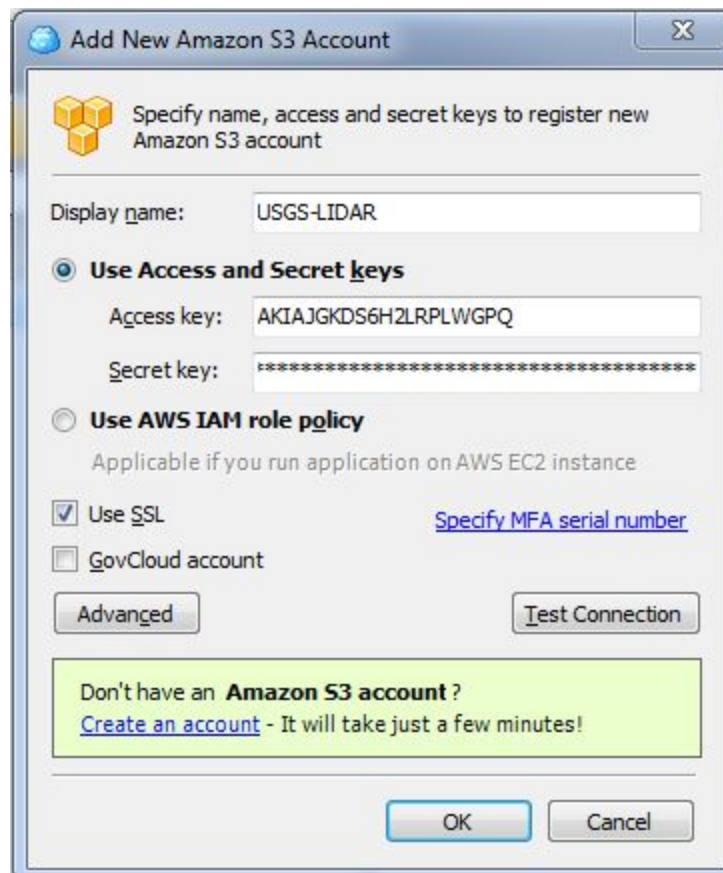
```
aws s3api get-object --bucket usgs-lidar --key  
Projects/PR_PuertoRico_2016_LAS_2017/USGS_LPC_PR_PuertoRico_2016_19QGA59503600_  
LAS_2017.laz USGS_LPC_PR_PuertoRico_2016_19QGA59503600_LAS_2017.laz  
--request-payer requester
```

CloudBerry Explorer

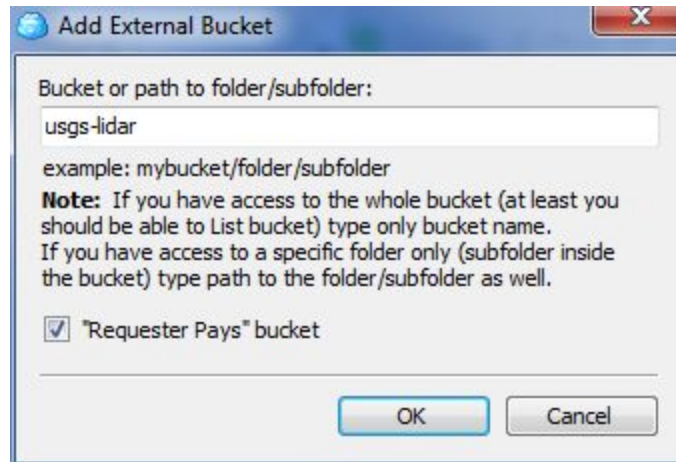
CloudBerry Explorer is a Windows client that interacts with Amazon S3 requester bucket. Both free and Pro (\$39.99) versions are available at: <https://www.cloudberrylab.com/explorer.aspx>

Once installed, the following steps are used to configure the client for accessing the **usgs-lidar** requester pays bucket.

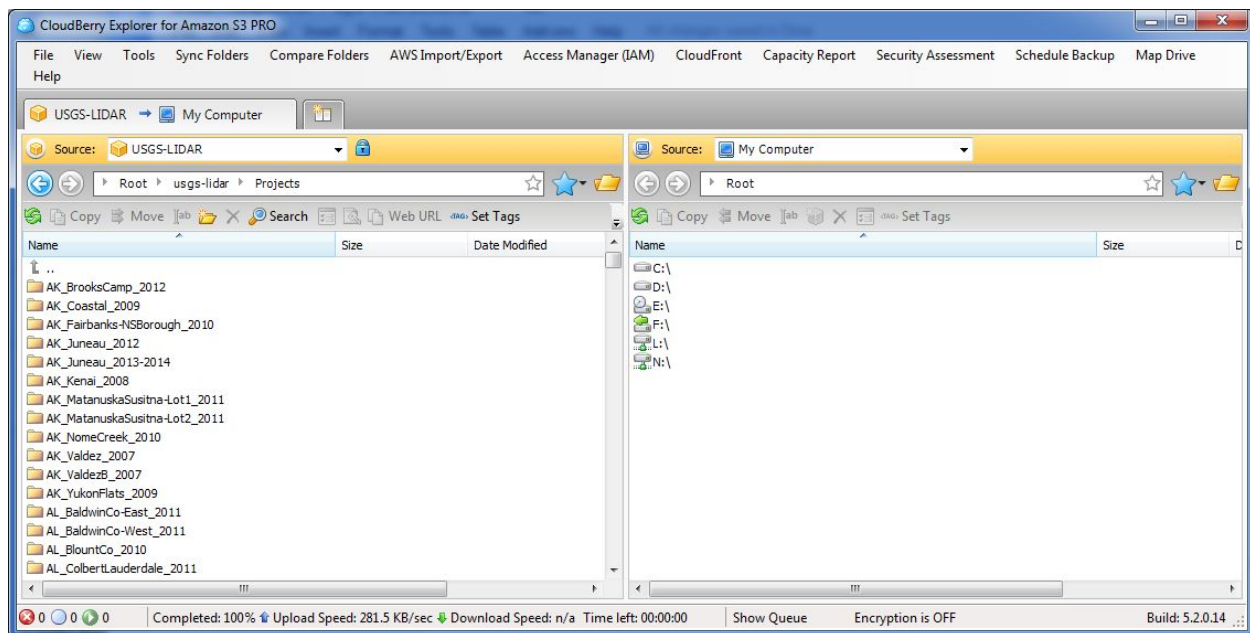
1. File Add New Amazon S3 Account



2. After making a connection to USGS-LIDAR, click the External Bucket icon  to create a path to the **usgs-lidar** bucket.



You can now use CloudBerry like you would a normal File Explorer to browse and drag and drop files to your computer.



S3 Browser

The S3 Browser (<https://s3browser.com/>) is a free (for personal use) Windows client. The Pro version is available for \$29.95 (for business and government use).

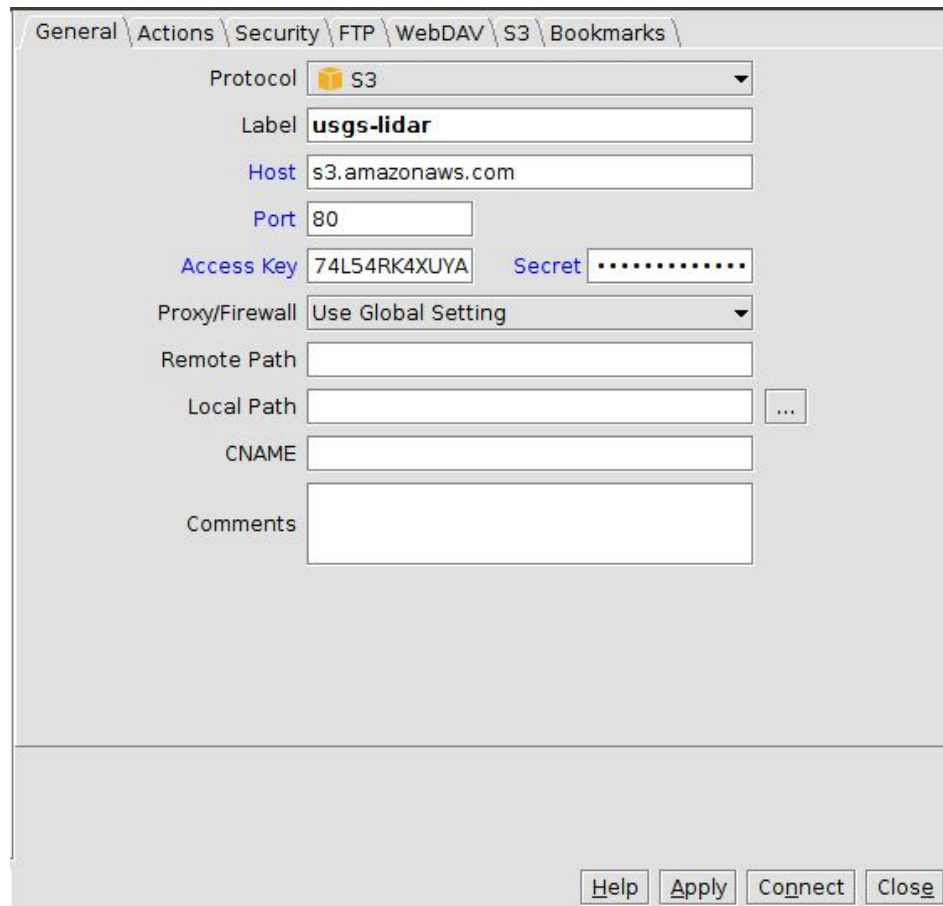
Specific instructions for using S3 Browser with an external user pays bucket can be found at:
<http://s3browser.com/requester-pays-buckets.aspx>

CrossFTP Pro/Enterprise

The CrossFTP Pro/Enterprise client is available for \$24.99 and runs on Windows, Mac and Linux platforms. The free version does not support Requester Pays bucket access.

Basic Steps for Configuring:

1. Create a new Site and choose Protocol as S3/HTTPS, or S3, and fill in the Access Key and Secret Key.



The screenshot shows the 'General' tab of the CrossFTP configuration window. The 'Protocol' dropdown is set to 'S3'. The 'Label' field contains 'usgs-lidar'. The 'Host' field contains 's3.amazonaws.com'. The 'Port' field contains '80'. The 'Access Key' field contains '74L54RK4XUYA' and the 'Secret' field contains a masked password. The 'Proxy/Firewall' dropdown is set to 'Use Global Setting'. The 'Remote Path', 'Local Path', 'CNAME', and 'Comments' fields are empty. The 'Local Path' field has a browse button ('...'). At the bottom right, there are buttons for 'Help', 'Apply', 'Connect', and 'Close'.

Field	Value
Protocol	S3
Label	usgs-lidar
Host	s3.amazonaws.com
Port	80
Access Key	74L54RK4XUYA
Secret
Proxy/Firewall	Use Global Setting
Remote Path	
Local Path	
CNAME	
Comments	

2. Click the S3 tab and make sure the Requester Pays checkbox is selected.

Lidar Point Cloud on AWS Requester Pays Instructions

The screenshot shows the 'S3' tab in the CrossFTP Pro settings window. At the top, there is a tab bar with 'General', 'Actions', 'Security', 'FTP', 'WebDAV', 'S3', and 'Bookmarks'. Below the tab bar is an 'API Set' dropdown menu. The main content area is divided into two sections: 'DevPay' and 'Toggles'. The 'DevPay' section contains a checkbox for 'Use DevPay', which is currently unchecked. Below this are two text input fields: 'DevPay User Token' and 'DevPay Product Token'. The 'Toggles' section contains four checkboxes: 'Reduced Redundancy Storage' (unchecked), 'Enable server side encryption' (unchecked), 'Requester Pay' (checked), and 'Use default metadata' (unchecked). To the right of the 'Use default metadata' checkbox is a small '...' button. At the bottom right of the window are four buttons: 'Help', 'Apply', 'Connect', and 'Close'.

General | Actions | Security | FTP | WebDAV | S3 | Bookmarks

API Set ...

DevPay

☐ Use DevPay

DevPay User Token

DevPay Product Token

Toggles

☐ Reduced Redundancy Storage

☐ Enable server side encryption

☒ Requester Pay

☐ Use default metadata ...

Help Apply Connect Close

3. Click the Apply button and Close to save the settings.
4. Double-click the **usgs-lidar** connection.

Specific instructions for configuring CrossFTP Pro to access S3 can be found at <http://www.crossftp.com/amazon-s3-client.htm>.